

PSUEDO-GEM BREADBOARD & EXPERIMENTINTRODUCTION

A breadboard and experiment is proposed to determine if a single GEM of a given scene can be altered in a controllable, known manner to simulate other GEMS of the same scene but with differing optical parameters such as haze, MTF, density, etc.

BREADBOARD EQUIPMENT

STAT The experiment consists of a subjective comparison of two GEM images on a ground glass screen. One "low quality" GEM is imaged directly onto the screen thru a Aero-Ektar lens at $f/4$. A second GEM, of higher quality is imaged adjacent to the first through an identical lens and through an arrangement that permits the quality of the image to be varied in several aspects (see figure 1).

The beam splitter arrangement allows a varying amount of uniform illumination to be placed in the field to give the effect of contrast reduction. Variation of the aperture stop through the range $f/4$ to $f/16$ simulates an approximate 4:1 reduction in the cutoff frequency of the optical system MTF. Provision is made, through variable intensity lamps and interchangeable sets of neutral density filters, to maintain equal illumination of the two images, or to simulate varying net densities.

Finally, other "aberration inputs" may be evaluated by placing simulated wavefront aberrations into the path of the GEM image.

STATEMENT OF WORK

STAT

[] proposes to furnish the personnel, materials, and facilities to accomplish the following:

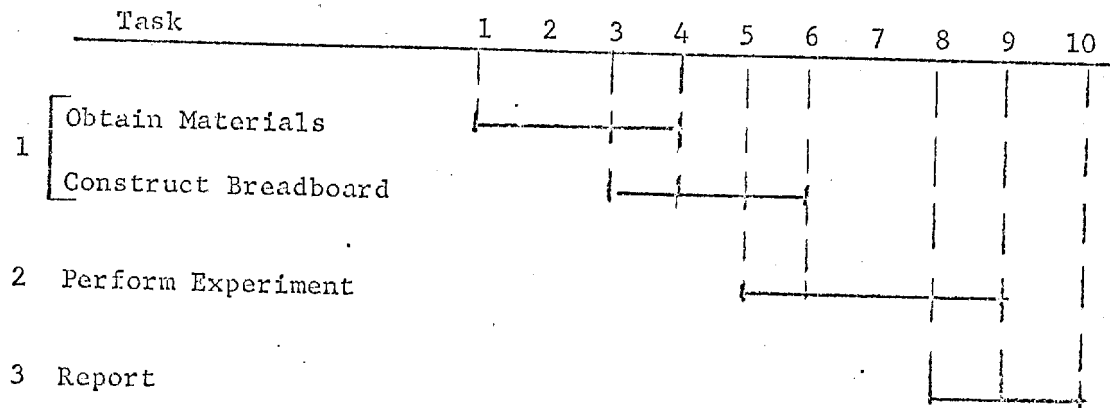
(1) Construct the simple breadboard in accordance with figure 1 and in keeping with the nature of the experiment. Some of the equipment can be obtained on loan from the model shop, to reduce cost.

(2) Conduct an experiment to determine if a high-quality GEM may be degraded in a known, controllable manner to simulate GEMS of lower quality. Check correspondence of different subjects and repeatability of individuals. Investigate each of the degrading factors with respect to limits and interrelationships.

(3) Letter report on the results of Task 2 with recommendations for future work.

PSEUDO-GEM EXPERIMENT

Schedule (Weeks A.R.O.)



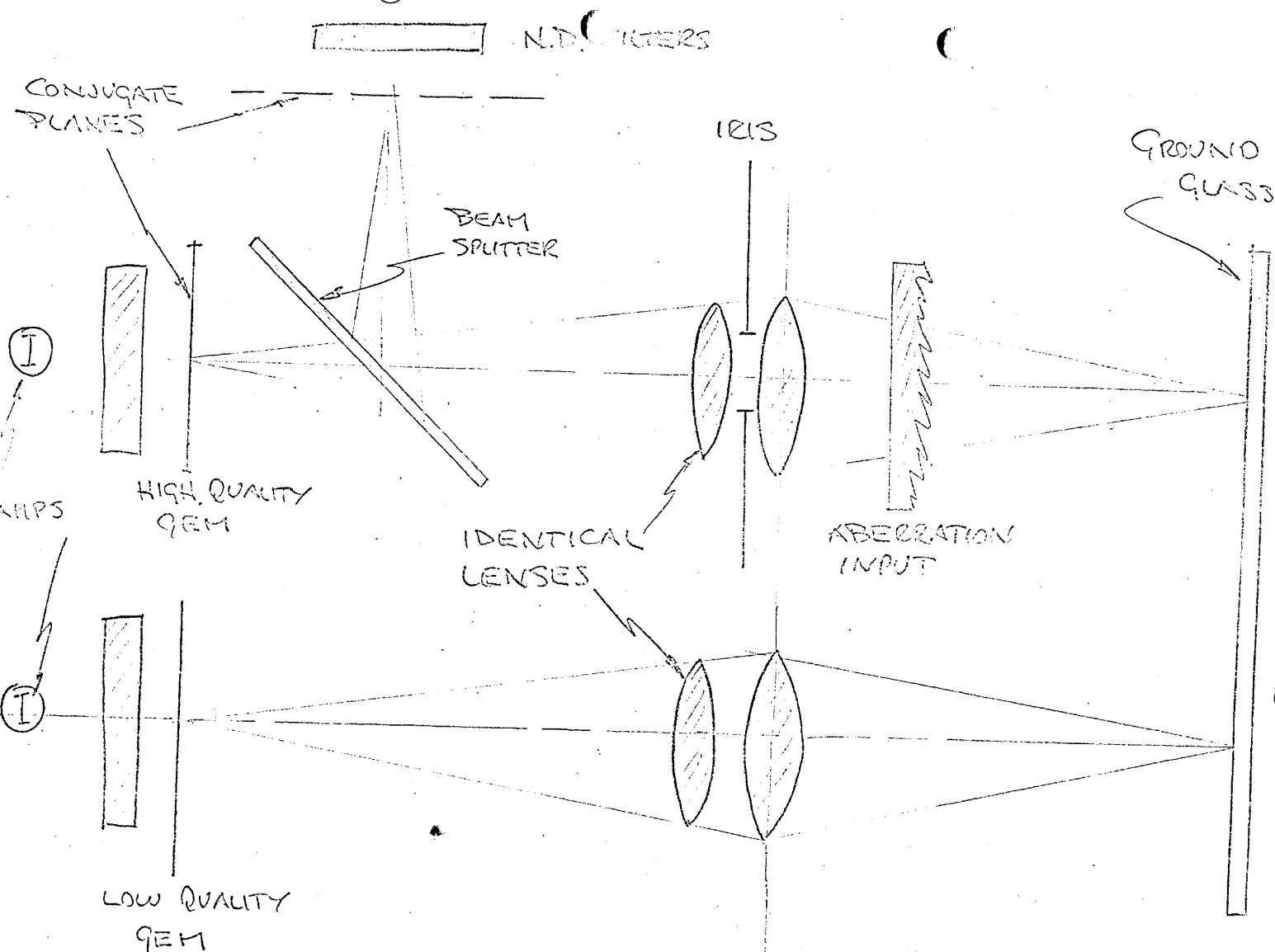


FIGURE 1 - OPTICAL BREADBOARD

BEST COPY

AVAILABLE

STAT

Approved For Release 2002/06/17 : CIA-RDP78B04747A000700020017-5

Approved For Release 2002/06/17 : CIA-RDP78B04747A000700020017-5

SECRET

Approved For Release 2002/06/17 : CIA-RDP78B04747A000700020017-5

R & D CATALOG FORM		DATE
1. PROJECT TITLE/CODE NAME Psuedo-GEMS Experiment		30 September 1966
2. SHORT PROJECT DESCRIPTION To determine experimentally if a GEM can be optically altered in a controlled manner to simulate other GEMS of the same scene but with different optical characteristics.		
3. LOCATION OF CONTRACTOR		
4. TYPE OF CONTRACT CPFF Change-of-scope to Contract		
5. CLASS OF CONTRACTOR Manufacturer		
6. FUNDS FY 19 66 \$ FY 19 67 \$ FY 19 68 \$ None		7. BUDGET PROJECT NO. NP-A-6-04067
8. REQUISITION NO.		9. SECURITY CLASS. AA-Secret T-Unclassified W-Unclassified
10. EFFECTIVE CONTRACT DATE (Begin - end) 1 October 66 - 31 December 66		
11. RESPONSIBLE DIRECTORATE/OFFICE/PROJECT OFFICER TELEPHONE EXTENSION DDI/NPIC/P&DS/		
12. REQUIREMENT/AUTHORITY The requirement for the basic contract is to develop a technique to objectively evaluate the image quality of operational photography. This change of scope to allow experimentation of a potential alternate technique.		
13. TYPE OF WORK TO BE DONE Applied Research		
14. CATEGORIES OF EFFORT		
MAJOR CATEGORY Image Analysis		SUB-CATEGORIES GEMS Development
15. END ITEM OR SERVICES FROM THIS CONTRACT/IMPROVEMENT OVER CURRENT SYSTEM, EQUIPMENT, ETC. Technical Report on the feasibility of using psuedo - GEMS as an image quality evaluation technique.		
16. SUPPORTING OR RELATED CONTRACTS (Agency & Other)/COORDINATION The basic contract has been coordinated through the Interservice Image Evaluation Committee and the Committee photo working panel. This change of scope has been coordinated with Technical Intelligence Division of NPIC.		
17. DESCRIPTION OF INTELLIGENCE REQUIREMENT AND DETAILED TECHNICAL DESCRIPTION OF PROJECT (Continue on addi- ti- ed) has been working on the development of printed GEMS for image quality evaluation. In the course of this research, there evolved a theory for making optical GEMS on a real-time basis. However, experimentation is required to prove or disprove this theory. If optical GEMS are feasible, it would eliminate the need for a very expensive, and cumbersome storage file of printed GEMS.		
18. APPROVED BY AND DATE		
OFFICE	DEPUTY DIRECTOR	DDCI
Approved For Release 2002/06/17 : CIA-RDP78B04747A000700020017-5		